## REMARKS

In the final office action mailed February 25, 2004, claims 1, 5, 7 - 10, 14, 16 - 19, 21 and 22 were rejected under 35 U.S.C. §103(a) over European Patent No. 0,905,879 (to Herzinger) in view of U.S. Patent No. 6,208,875 (to Damgaard et al.), and claims 2, 3, 11, 12 and 20 were rejected under §103(a) over Herzinger in view of Damgaard et al. and U.S. Patent No. 5,130, 670 (to Jaffe).

Applicant's invention relates to a modulator for use in a transmitter in a communication system that may be operated in any of a plurality of standards for modulation, such as GSM or DCS. The invention provides a modulator for a transmission circuit in which the frequency plan may be changed by choosing either $F_{LO} = F_{OUT} / (1 - n/r)$ or $F_{LO} = F_{OUT} / (1+n/r)$.

The final office action mailed on February 25, 2004 states, in part, that the Herzinger et al. reference teaches a transmitter that can only be used in one of the GSM and DCS standards, not both standards (final office action dated 2/25/2004, page 14), and that the Damgaard et al. reference teaches switching between GSM and DCS systems by selectively controlling the output of the bandpass filter to be $RF_{LO} - RF_{OUT}$ (GSM, high side rejection) or $RF_{OUT} - RF_{LO}$ (DCS, low side rejection) (final office action dated 2/25/2004, page 15). The final office action then states:

> Therefore, the examiner proposes a modification of Herzinger's system by incorporating the feature of selectively controlling the output of the bandpass filter to be $RF_{LO} - RF_{OUT}$ or $RF_{OUT} - RF_{LO}$ as taught by Damgaard, into the bandpass filter TP of Herzinger to achieve dual band operation.

(final office action dated 2/25/2004, page 16)

As discussed in more detail below, applicant agrees with the assessment of each of the

cited references individually, but disagrees with the assertions in the final office action that a combination of the cited references teaches or suggests the subject matter of the claims in the present application.

**The Herzinger et al. reference**

The final office action mailed on February 25, 2004 asserts that "Herzinger's transmitter can only be used in one of the GSM or DCS standards, not both standards" (final office action mailed February 25, 2004, page 14), and that "Herzinger never indicates that a goal of his invention is to provide a transmitter that is able to switch between GSM and DCS standards" (final office action mailed February 25, 2004, page 14).

Applicant agrees with this assessment of the Herzinger et al. reference. Applicant's assertions in the response filed November 10, 2003, that the frequency plan of Herzinger et al. may be changed (e.g., from GSM to DCS) by varying the values of N and R of the frequency dividers were directed toward the question of how the circuit of Herzinger et al. might be modified to achieve a dual band system. The Herzinger et al. reference does disclose a frequency plan that provides that $F_{LO} = F_{OUT} / (1 - n/r)$, but this is the same frequency plan for GSM as for DCS as well as for any other standard. (See the accompanying Declaration of Robert J. Broughton, hereafter "Broughton Declaration", ¶5). Applicant's invention provides that $F_{LO} = F_{OUT} / (1 - m/n)$ for GSM and $F_{LO} = F_{OUT} / (1 + m/n)$ for DCS. This difference is significant because it provides an efficient frequency plan that may be used for either mode of operation.

The Herzinger et al. reference, therefore, does not provide a solution to the need for a dual band radio frequency transmitter system, let alone one that provides a first frequency divider unit for providing a divide by *m* function and a second frequency divider unit for providing a divide by *n* function such that $F_{LO} = F_{OUT} / (1 + m/n)$ in a first mode of operation and $F_{LO} = F_{OUT} / (1 - m/n)$ in a second mode of operation as claimed in each of the claims. Broughton Declaration, ¶6.

**The Damgaard et al. reference**

The Damgaard et al. reference discloses a circuit that provides a different solution to the need for a dual band radio frequency transmitter system than that provided by the present invention. (Damgaard et al., col.5, lines 6 - 11) Broughton Declaration, ¶7. The Damgaard et al. reference discloses that tunable VCO 71, one of the VCOs 57 or 59, one of the VCOs 111 or 113, and filter 104 are used to choose one or the other signal during transmission and reception and to remove the signal that is not being used. (Damgaard et al., col4, lines 47 - 60, col.5, lines 7 - 12, 49 - 50 and 60 - 62). Broughton Declaration, ¶7.

The transmitter circuit in the Damgaard et al. reference employs a different frequency plan than that employed in the present invention. Broughton Declaration, ¶8. The Damgaard et al. reference does not disclose a divide by *m* frequency divider unit and a divide by *n* frequency divider unit such that $F_{LO} = F_{OUT} / (1 + m/n)$ in a first mode of operation and $F_{LO} = F_{OUT} / (1 - m/n)$ in a second mode of operation. Broughton Declaration, ¶9. This is not the same as tuning VCO 71, switching between VCOs (57 or 59) and (111 or 113) and applying the filter 104. Broughton Declaration, ¶10. The difference is significant because the Damgaard et al. circuit

discloses using either multiple VCOs or tunable VCOs, while applicant's circuit permits only two fixed VCOs to be employed. Broughton Declaration, ¶11. Moreover, the circuit of Damgaard requires that frequencies of both the local oscillator (LO) and the intermediate frequency (IF) be changed when switching between GSM and DCS. Broughton Declaration, ¶12. Applicant's circuit includes no IF VCO and does not require changing the LO VCO frequency. Broughton Declaration, ¶12.

Although the Damgaard et al. reference discloses that it also achieves dual band operation, it clearly does so in a very different way than that claimed in the present application.

**The Combination of the Herzinger et al. reference and the Damgaard et al. reference**

No combination of the prior art of record discloses, teaches or suggests this solution. A rejection under §103 must rest on a factual basis without hindsight reconstruction of the invention from the prior art. In establishing a *prima facia* case of obviousness, it is incumbent on the examiner to provide a reason why one of ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. Ex parte Clapp, 227 U.S.P.Q. 972, 973 (Bd.Pat.App.&Int. 1985). The requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from the applicant's own disclosure. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 U.S.P.Q.2d 1434, 1452 (Fed. Cir. 1988), *cert denied*, 488 U.S. 825, 102 L.Ed.2d 51, 109 S.Ct. 75 (1988). A sustainable rejection under § 103, therefore, requires more than modifying the prior art to achieve the claimed invention. The "mere fact that the prior art could be so modified would not

have made the modification obvious unless the prior art suggested the desirability of the modification." In re Gordon, 933 F.2d 900, 902, 221, U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

The question, therefore, is not whether the cited art could be modified to arrive at the applicant's invention, but whether the cited prior art taught or suggested the subject matter of applicant's claims without using applicant's invention as a guide.

Applicant submits that there is no motivation to combine the Damgaard et al. reference with the Herzinger et al. reference as the Damgaard et al. reference already provides a dual band system using a different circuit and frequency plan. Although the final office action states that "the examiner proposes a modification of Herzinger's system ... as taught by Damgaard ...", there is no teaching or suggestion of such a modification. The Damgaard circuit already provides a dual band system using a very different circuit as discussed above, and the Herzinger circuit provides single band operation. There is no language in either patent that provides any motivation to combine the teachings of these patents to arrive at the applicant's invention. Broughton Declaration, ¶13.

Moreover, any combination of the two references would not result in a system that uses a frequency plan as employed in the present application. Broughton Declaration, ¶13. The final office action proposes that the feature of selectively controlling the output of the bandpass filter to be $RF_{LO}$ - $RF_{OUT}$ or $RF_{OUT}$ - $RF_{LO}$ as taught by Damgaard et al. into the bandpass filter TP of Herzinger et al. to achieve dual band operation (final office action mailed 2/25/2004, page 16). Applicant respectfully disagrees for the following reasons.

First, the output of the bandpass filter 104 in Damgaard et al. is not switched by the filter 104, but rather by the switching network that precedes the filter 104, and this switching network

includes multiple VCOs 111, 113 (or a tunable VCO) and a combiner or switch (also labeled 113 in Figure 3 of Damgaard et al.). Broughton Declaration, ¶14. The bandpass filter 104 is a bandpass filter, not a switch. Broughton Declaration, ¶15. For this reason alone, substituting the bandpass filter 104 of Damgaard et al. for the filter TP in Herzinger et al. would not achieve a dual band system as claimed. Broughton Declaration, ¶15. In fact, the frequency plan in the circuit of Herzinger et al. does not even rely on the characteristics of the filter TP. Broughton Declaration, ¶15.

Secondly, the frequency plans of Herzinger et al. and Damgaard et al. are not compatible since Damgaard et al. requires changing both the LO and IF frequencies as well as their relationship, while Herzinger et al. requires that the relationship between the LO and IF frequencies be fixed. Broughton Declaration, ¶16. There is no clear way, therefore, in which the teachings of these two references may be combined. Broughton Declaration, ¶17.

Applicant has developed a circuit in which the frequency plan may be changed (e.g., from GSM to DCS) by choosing either $F_{LO} = F_{OUT}/(1 - n/r)$ or $F_{LO} = F_{OUT}/(1+n/r)$. None of the cited references alone disclose, teach or suggest this frequency plan as claimed in each of independent claims 1, 10 and 19, and no combination of the cited references provides such a teaching or suggestion.

The Jaffe reference does not disclose a translation loop modulator having two modes of operation, and further provides no teaching or suggestion that would have led one of ordinary skill in the art at the time of the invention to modify the disclosures of the Herzinger et al. reference and the Damgaard et al. reference to achieve the subject of the applicant's invention as claimed in dependent claims 2, 3, 11, 12 and 20.

Each of claims 1 - 22, therefore, is in condition for allowance. Favorable action consistent with the above is respectfully requested.

Respectfully submitted,

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